PRINTED CIRCUIT BOARD INCLUDING BENDING REGION

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application claims the benefit of priority from Korean Patent Application No. 10-2015-0146094, filed on Oct. 20, 2015, in the Korean Intellectual Property Office, the disclosure of which is incorporated herein in its entirety by reference.

BACKGROUND

[0002] The inventive concepts relate to a printed circuit board (PCB), and more particularly, to a flexible PCB including a bending region that is repeatedly bent.

[0003] As the electronic industry has greatly advanced. and requirements of users have increased, electronic apparatuses have been smaller and various types of wearable devices have been developed. Since wearable devices typically have curved surfaces in order to be worn on a human body, or are repeatedly bent in order to be attached or detached to or from the human body, the wearable devices include flexible PCBs.

SUMMARY

[0004] The inventive concepts provide a printed circuit board (PCB) including a bending region that may improve the reliability of an electronic apparatus that is repeatedly bent when being used.

[0005] According to an example embodiment of the inventive concepts, a printed circuit board (PCB) includes a base substrate having a first edge and a second edge on both sides of the base substrate, the base substrate having a bending region including an opening adjacent to the first edge, an opening adjacent to the second edge, and mounting regions extending from both ends of the bending region and including device mounting portions, a connection line formed on the base substrate and crossing the bending region, the connection line configured to connect the device mounting portions of the mounting regions extending from, both ends of the bending region, and a guard pattern formed on one or more of a top surface and a bottom surface of the base substrate along a boundary of one or more of the openings.

[0006] According to another example embodiment of the inventive concepts, a printed circuit board (PCB) includes a base substrate having a first edge and a second edge on both sides of the base substrate, the base substrate having a bending region that includes at least one pair of openings respectively adjacent to the first edge and the second edge and facing each other and mounting regions that extend from both ends of the bending region and include device mounting portions, a connection line formed on the base substrate and crossing bending region, the connection line configured to connect the device mounting portions of the mounting regions that extend from the both ends of the bending region, and a guard pattern formed on each or at least one of a top surface and a bottom surface of the base substrate along a boundary of each or at least one of the openings.

[0007] According to another example embodiment of the inventive concepts, a printed circuit board (PCB) includes a base substrate including at least one opening in at least one edge thereof in a bending region configured to be bent, at least one guard pattern along a boundary of the at least one opening, and a connection line on the base substrate and crossing the bending region, the connection line electrically connecting at least two portions on opposite sides of the bending region.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] Example embodiments of the inventive concepts will be more clearly understood from the following detailed description taken in conjunction with the accompanying drawings in which:

[0009] FIG. **1** is a schematic view for explaining an electronic apparatus and a printed circuit board (PCB), according to an example embodiment;

[0010] FIG. **2** is a plan view illustrating parts of a PCB, according to an example embodiment;

[0011] FIG. **3** is a plan view illustrating parts of a PCB, according to an example embodiment;

[0012] FIG. **4** is a plan view illustrating parts of a PCB, according to an example embodiment;

[0013] FIG. **5** is a plan view illustrating parts of a PCB, according to an example embodiment;

[0014] FIG. **6** is a plan view illustrating parts of a PCB, according to an example embodiment;

[0015] FIG. **7** is a plan view illustrating parts of a PCB, according to an example embodiment;

[0016] FIG. **8** is a plan view illustrating parts of a PCB, according to an example embodiment;

[0017] FIG. **9** is a plan view illustrating parts of a PCB, according to an example embodiment;

[0018] FIG. **10** is a plan view illustrating parts of a PCB, according to an example embodiment;

[0019] FIG. **11** is a plan view illustrating parts of a PCB, according to an example embodiment;

[0020] FIG. **12** is a plan view illustrating parts of a PCB, according to an example embodiment;

[0021] FIG. **13** is a plan view illustrating parts of a PCB, according to an example embodiment;

[0022] FIG. **14** is a plan view illustrating parts of a PCB, according to an example embodiment;

[0023] FIG. **15** is a plan view illustrating parts of a PCB, according to an example embodiment;

[0024] FIG. **16** is a plan view illustrating parts of a PCB, according to an example embodiment;

[0025] FIG. **17** is a plan view illustrating parts of a PCB, according to an example embodiment;

[0026] FIG. **18**A is a partial enlarged cross-sectional view of a PCB, according to an example embodiment;

[0027] FIG. **18**B is a partial enlarged cross-sectional view of a PCB, according to an example embodiment;

[0028] FIG. **18**C is a partial enlarged cross-sectional view of a PCB, according to an example embodiment;

[0029] FIG. **18**D is a partial enlarged cross-sectional view of a PCB, according to an example embodiment;

[0030] FIG. **18**E is a partial enlarged cross-sectional view of a PCB **10-5** according to an example embodiment.

[0031] FIG. **18**F is a partial enlarged cross-sectional view of a PCB, according to an example embodiment;

[0032] FIG. **19** is a schematic view for explaining an electronic apparatus and the PCB, according to an example embodiment;

[0033] FIG. **20**A is a partial enlarged cross-sectional view of a PCB, according to an example embodiment;

[0034] FIG. **20**B is a partial enlarged cross-sectional view of a PCB, according to an example embodiment;